

The vast majority of studies on pain management have been conducted on the adult patient. These studies have validated current theories of pain and described its multidimensional nature. Both pharmacologic and nonpharmacologic interventions have been developed for adult pain. Despite this scientific base, pain prevention, alleviation, and control often are handled inadequately and patients continue to suffer needlessly (Donovan, Dillon, & McGuire, 1987).

Studies on the adult with acute and episodic pain encompass the dimensions of pain, pain assessment, and pharmacologic and nonpharmacologic interventions. The studies are drawn from a variety of medical-surgical patient populations.

## State of the Science

### *Dimensions of Pain*

A number of dimensions are apparent in acute and episodic pain in the adult. These include physiological, sensory, affective, cognitive, behavioral, and sociocultural dimensions.

### *Physiological Dimension*

The physiological dimension is concerned with the etiology of pain and focuses on anatomic, molecular, and biochemical components. Research in this area includes basic laboratory research in which physiological mechanisms are identified, mapped out, tested, and explored. An analysis of the extensive research in this area is available in the pain literature (Wall & Melzack, 1984; Fields, 1987).

Current studies include testing evidence for functions of nociceptors, ascending and descending neuro systems, and neurotransmitters. The endorphins, the body's own narcotic-like substances that produce analgesia, were identified in 1977 (Snyder). These substances are involved with preventing transmission of the pain impulse from reaching the conscious level. Research in this area has focused on the differences in pain perception across individuals (Janal, Colt, Clark, & Glusman, 1984; Tamsen, Sakurada, & Wahlstrom, 1982). Other advances in the study of endorphins have revealed that decreases occur in pro-

longed pain, recurrent stress, and the prolonged use of morphine or alcohol, while increases in endorphins occur with brief pain, brief stress, physical exercise, massive trauma, some types of acupuncture, some types of transcutaneous electric nerve stimulation, and sexual activity (Clark, Yang, & Janal, 1986; Emrich, 1981; Janal, et al. 1984; Tamsen, et al. 1982; Terenius, 1984; Whipple & Komisaruk, 1985).

Other research involves the identification and function of several receptor sites for opioids; namely the Mu receptor site, Kappa receptor site, and Sigma receptor site (Houde, 1979; Jaffe & Martin, 1985; Martin, Eades, & Thompson, 1976; Millan, 1986; Offermeier & Van Rooyen, 1984; Rogmagnoli & Keats, 1980; Wood, 1982; Yaksh, Durant, Gaumann, Stevens, & Mjanger, 1987). Analgesics work best at different receptor sites, some being agonists, which bind partially or tightly to a specific receptor site and act by initiating activity at that site; and some being antagonists, which also can bind partially or tightly to the receptor site and act by blocking the activity from that site. Examination of the intrinsic potency of opioids for specific receptors has been identified as a valuable area of research. Such studies may increase the understanding of tolerance, the condition in which increasing doses of medication are needed to maintain the same level of analgesia. The matching of specific analgesics to specific receptor sites provides an opportunity to study tolerance. Knowledge gained from this research can provide the basis for better clinical management of pain with specific medication regimens aimed at maintaining appropriate analgesia while minimizing side-effects (Foley, 1992).

Studies on the molecular biology of pain have been summarized in a model proposed by Dubner (1992) describing the responses that increased nociceptor activity has on spinal cord dorsal horn hyperactivity and behavioral hyperalgesia. Increased neural activity from a site of injury leads to increased depolarization or excitement of receptor sites, and increased pain. A promising application of this research is the use of preemptive local anesthesia for treatment of postoperative pain. Local anesthetics administered with general anesthesia before surgery can prevent or reduce the neural activity from the site of tissue damage, resulting in decreased postoperative pain (Dubner, 1992).

Another series of studies has focused on the response of the immune system to pain (Liebeskind, 1992). Natural killer cells (NK) from the immune system are thought to play an important part in protecting the body from the development of cancer. In studies of the effects of an experimental abdominal surgery as a stressor for rats, Liebeskind (1992) found a very large suppression of NK cells, followed by a marked increase in cancer spread. This finding provides a powerful argument for the relief of pain for patients who have undergone surgery, especially cancer patients.

Additional research on the physiological dimension includes exploration of the physiological mechanisms involved in the development of specific pain conditions for specific diseases. In the National Heart, Lung and Blood Institute's Cooperative Study of Sickle Cell Disease, the incidence of pain episodes, associated risk factors, and effects of pain on early death for patients with sickle cell disease is reported (Farber, Koshy, & Kinney, 1985; Gaston & Rosse, 1982; Konotey-Ahulu, 1974; Platt, Thorington, Brambilla, Milner, Rosse, Vichinsky, & Kinney, 1991). This large study of more than 3,500 patients correlated pathophysiologic components (fetal hemoglobin and hematocrit levels) with various demographic characteristics and the occurrence of painful episodes (pain rates). Patients were classified into four groups (sickle cell anemia, sickle cell  $\alpha^0$ -thalassemia, sickle cell  $\alpha^+$ -thalassemia, or hemoglobin sickle cell disease) and were followed an average of 5.13 years. Forty-five per cent of the population was 9 years of age or less, 26% was 10-19 years of age, and 29% was 20 years or older. The group more than 50 years of age comprised only 1% of the study population. Results revealed wide variations in pain episodes between and within each of the four disease groups, and revealed a direct variation between hematocrit and pain rate, and an inverse variation between fetal hemoglobin level and pain rate. Pain rates increased as patients grew older up to 30 years, and declined thereafter. Among patients with sickle cell anemia who were more than 20 years old, those with high rates of pain episodes tended to die earlier than those with low rates. These results confirmed the importance of pain management in the acute morbidity of sickle cell disease.

The prevalence of pain in persons with AIDS has been reported in two studies (Schofferman, 1988; Lebovits, Lefkowitz, McCarthy, Simon, Wilpon, Jung, & Fried, 1989). Sample size consisted of 100 consecutive patients admitted to a hospice agency and 134 randomly selected charts from a hospitalized population of 549 patients respectively. A variety of pathological conditions was associated with the pain: peripheral neuropathy, abdominal pain, headache, skin pain, oro-pharyngeal pain, and chest pain. Pain of short duration and persistent or recurring pain were both

revealed. Pain of short duration was generally due to a potentially reversible event such as an infection; treatment of the underlying pathological event relieved the pain. The second, recurring type, had no cause directly treatable, and thus was amenable to palliative treatment. These studies in patients with AIDS revealed beginning evidence of the patterns of pain, and the need for prospective, longitudinal studies in larger samples.

The management of pain among persons diagnosed with drug abuse presents special problems and is an area of little research to date. Substances usually included in the general definition of drug abuse include illicit substances such as cocaine, alcohol, and/or opioids (Payne, 1989). Abusers can be classified into three groups: those with a remote history of addiction, those currently treated in methadone maintenance programs, and those presently abusing opioids and other drugs actively. One study revealed that all three groups have a relatively high risk for poor or inadequate pain management (Macaluso, Weinberg, & Foley, 1988). Principles and clinical guidelines have been identified to formulate an appropriate approach to managing pain in this population (Payne, 1989). Systematic testing of the guidelines is vital for determining approaches that maintain professional accountability for the health professional treating the drug abuser with additional medical pathology, while limiting the abuser's negative behavior, and controlling pain and suffering.

Even more extensive are studies on the prevalence and nature of pain in cancer patients. Ahles, Ruckdeschel, and Blanchard (1983) included the organic origin of pain such as a tumor metastasized to the bone or infiltrating nerves or hollow organs as illustrations of this physiological dimension of pain. Foley (1979) described three types of pain in patients with cancer: pain associated with direct tumor involvement, cancer treatment, and unrelated to either the tumor or the treatment. Pain associated with cancer treatment involves diagnostic testing as well as surgery, chemotherapy, and radiation therapy. Additional studies described pain in terminally ill cancer patients (Ventafridda, Tamburini, Caraceni, De Conno, & Naldi, 1987; Daut & Cleeland, 1982; Bonica, 1985; Portenoy, 1989; Twycross & Fairfield, 1982). The etiology of pain in this population is usually tumor related (as opposed to treatment related), and may be complex, including injury to somatic structures, viscera, or nerves. Multiple other dimensions of pain are involved during terminal cancer illness (e.g. the occurrence of "break-through pain," the impact on quality of life, previous experience with chronic disease, and previous pain experiences), and make the syndrome complex to assess and manage.

## ***Sensory Dimension***

The sensory dimension, as defined by Ahles, et al. (1983) involves the nature of the pain, and the relationships among the characteristics of location, intensity, and quality. This dimension is specifically related to the assessment of pain, and is reflected in many assessment instruments discussed below. When patients report pain, they usually describe the location of the pain, the intensity, and the quality.

Studies in this area report pain in specific medical conditions. Burn patients experience intense pain that lasts a long time and increases during treatments. Dressing changes, debridement, exercises, and procedures related to grafting all are associated with intense pain (Wagner, 1977; Perry, Heidrich, & Ramos, 1981; Perry & Heidrich, 1982). Pain in sickle cell disease is associated with the acute sickling event, and may be located in the venous system, joints, extremities, and in the abdomen (Benjamin, 1989; Hardy, 1981). The intensity of sickle cell disease pain is extreme and is frequently the precipitating event for seeking medical treatment and for hospitalization.

The pain of herpes zoster (HZ) generally diminishes over weeks to months, but may persist in a minority of patients into a syndrome known as post-herpetic neuralgia (PHN). The pain has been described as severe and continuous, with patients reporting burning, itching, and lancinating pain (Burgoon, Burgoon, & Baldrige, 1957; Colding, 1969; Portenoy, Duma, & Foley, 1986; Watson, Evans, Reed, Merskey, Goldsmith, & Warsh, 1982). Another acute pain syndrome is seen in the patient with trigeminal neuralgia. This pain has been described as an abrupt and intense paroxysm of pain, located in the area innervated by the trigeminal nerve. It is generally one sided and comes in bursts, and patients live in terror of the next episode (Sweet, 1986; Tew & Van Loveren, 1988).

Phantom-limb pain, which occurs following amputation, is a complex phenomena described differently by sub-groups of patients and probably is related to different physiological mechanisms (Sherman & Barja, 1989). When vascular pathology is present, the pain is described as burning, tingling, and throbbing. Other descriptions include shooting and stabbing phantom pain. Still other patients experience cramping phantom pain. Pain associated with myocardial infarction is ischemic and described as crushing, constricting, aching, and radiating (Hofgren, Bondestam, Gaston, Johansson, Jern, Herlitz, & Holmberg, 1988). Pain associated with peripheral vascular disease (Taylor & Porter, 1986; Boobis & Bell, 1982) is also ischemic and described as acute and piercing.

Pain in patients with cancer occurs in about one-third of those undergoing treatment, and in two-thirds of those with advanced disease (Foley & Inturrisi, 1989; Ferrell, Rhiner, Cohen, & Grant, 1991; McGuire, 1987b; Wilkie, 1990). The pain differs in location, intensity, and quality dependent upon the site of the tumor and stage of disease. Pain for cancer patients has a strong impact on quality of life, and poor pain management is associated with decreased quality of life (Ferrell, Wisdom, & Wenzl, 1989).

Assessment of the patient's pain provides the foundation for pain management. Most assessment approaches focus initially on the sensory dimension of pain - its intensity and location. Additional studies in this area will continue to expand the foundation for accurate and specific pain assessment and management.

## ***Affective Dimension***

The affective dimension relates to the moods, psychological factors, and personality traits associated with pain. Literature on the affective dimension includes both anecdotal accounts and re-search reports. Experiences of pain that emphasize the affective dimension are reported in fiction, poetry, philosophy, and religion (Spross, 1985). These accounts emphasize the suffering associated with pain, and the terrible burden it inflicts on both the patient and the patient's family and loved ones (Ferrell, Ferrell, Rhiner, & Grant, 1991). Cassel (1982) made a distinction between suffering and physical distress, and challenged the medical profession to meet the obligation of relieving suffering as well as curing disease. The suffering component of pain was identified by Copp (1974) in interviews of 148 patients with pain and subsequently was explored further (Copp, 1990a; Copp, 1990b). A review of studies of the affective dimension of cancer-related pain reveals a variety of affective responses and a variety of relationships to the occurrence of pain (Table 5.1).

## ***Cognitive Dimension***

The cognitive dimension of pain includes the meaning of pain to the individual, coping strategies, and attitudes and beliefs about pain. One of the earliest researchers to describe how the meaning of pain differs across different types of pain was Beecher (1946) in studies of wounds inflicted during battle. Beecher noted that close to 70% of soldiers in battle who had major injuries of the chest, abdomen and bones did not take medication for their wounds and did not complain of pain. These same individuals, when hospitalized, illustrated a normal ability to perceive pain associated with diagnostic procedures, such as venipuncture. Beecher (1956) later compared these sol-

diers with a group of civilians who were hospitalized for surgical procedures of similar extent to the battle wounds. He found that only 17% of the civilians did not want medications for their surgical wounds. He concluded that for the soldiers, their wounds provided a way to leave the life-threatening situation of war and thus, perception of pain was reduced; for hospitalized surgical patients, the surgical wound was a major disruption to normal living and postoperative pain was expected.

Ahles et al. (1983) interviewed patients about the meaning of pain. The majority of the patients believed that the pain was an indication of advancing disease. Spiegel and Bloom (1983b) found that when patients believed that pain indicated increasing disease, these beliefs were significantly correlated with increased pain, anxiety, and depression. McGuire (1987a) found that 40% of cancer patients believed that increasing pain meant increasing disease. Ferrell, Rhiner, et al. (1991), in interviews of cancer patients with pain, found that pain became the illness as patients got progressively worse.

Other studies have revealed that patients' perceptions of pain vary with the impact of that pain on their daily activities (Daut & Cleeland, 1982; Rankin, 1980, 1982; Stam, Goss, Rosenal, Ewens, & Urton, 1985). As patients perceive that pain is interfering with daily activities, psychological distress is experienced, and may even persist after the pain is alleviated (Stam, et al., 1985). Additional studies have revealed that pain has a strong association with emotions such as acute anxiety, anger, and depression (Sternbach, 1976; Timmermans & Sternbach, 1976). Arathuzik (1991) studied coping in 80 cancer patients with metastatic breast cancer and examined the meaning of pain using a descriptive correlational research design. The patients experienced moderate pain, and viewed pain as challenging. They were determined to get well and overcome the pain. The main coping behavior identified was withdrawal and inactivity, and a prime strategy in coping with the pain was to reinterpret the pain in such a way that it could be controlled. These findings have begun to illustrate how patients' perceptions can influence pain and how these perceptions are related to the coping mechanisms employed.

### ***Behavioral Dimension***

The behavioral dimension includes observable and reportable behaviors that indicate pain, such as verbal and nonverbal expressions of pain, and behaviors used to control pain, such as guarding the area where the pain is located. Ahles et al. (1983) reported that cancer patients with pain spent less time walking or standing than those who did not have pain. Typical

behaviors observed during acute pain episodes include guarding, grimacing, cry-ing, rubbing the painful area, and reporting pain (Barbour, McGuire, & Kirchhoff, 1986; Bond & Pilowsky, 1966; McGuire, 1984a; Bressler, Hange, & McGuire, 1986; Copp, 1974; Donovan, 1985). These acute behaviors become less common as patients experience pain over time.

Patients' behaviors may also be a means of controlling the pain. In a study of 13 patients with cancer, Wilkie, Lovejoy, Dodd, and Tesler, (1988) observed a variety of behaviors and classified them into positioning behaviors, distractive behaviors, pressure manipulative behaviors, immobilizing/guard-ing behaviors, sleeping, eating, and moaning, in descending order of occurrence. These studies of pain behaviors have begun to describe and quantify the behaviors manifested by patients in pain. McCaffery and Beebe (1989) cautioned that patients may hurt even when such behaviors are not manifested.

### ***Sociocultural Dimension***

Some studies on the sociocultural dimension focus on ethnic, cultural, and spiritual differences in patients' perceptions of pain. One of the early studies examining the relationship between ethnic background and behavior, beliefs, and attitudes towards pain was conducted by Zborowski (1952). The investigation included 146 adult Irish, Italian, Jewish, and Old American male patients of lower and middle income backgrounds in the Veterans Hospital of New York City. Participant observation and interviews were used to collect data. Findings revealed that Jewish and Italian patients had more frequent emotional descriptions of the pain experience than did Old Americans and Irish. Irish and Old Americans reported that they preferred to hide their pain, while the Jewish and Italian patients stated that they expressed their inability to tolerate pain. Zborowski concluded that ethnic group membership may influence one's expression and report of pain. Zola (1966) compared Italian and Irish patients to determine differences in interpretations and responses to pain. Using open-ended interview questions, Zola talked with Italian Catholics, Irish Catholics, and Anglo-Saxon Protestants and reported that the lower-class Irish tended to perceive themselves in poorer health, reported fewer symptoms, and denied pain more often than the Italians. The Anglo-Saxon patients differed from both the Irish and the Italians regarding responses and perception of symptoms.

Wolff and Langley (1975) reviewed a number of studies of experimentally induced laboratory pain for differences due to religious and ethnic background. While no definitive conclusions could be drawn, evi-

dence for a strong role of culturally determined attitudes in pain perception and response was identified. Lipton and Marbach (1984) studied differences and similarities among patients with facial pain in five different ethnic groups: Black, Irish, Italian, Jewish, and Puerto Ricans. Results suggested similar pain responses across groups, but differences in the factors that influenced these responses. For example, Italians were most influenced by the duration of pain, whereas Jews and Puerto Ricans were most influenced by their level of psychological distress.

In a study of Arab-Americans' perceptions of pain, responses included vehement, persistent, and exaggerated verbal expressions of pain (Reizien & Meleis, 1986). Studies on differences between Blacks and Whites have revealed controversial findings (Flannery, Sos, & McGovern, 1981; Miller & Shuter, 1984). Additional studies have compared Chinese with other ethnic groups. Moore and Dworkin (1988) compared the pain perceptions of Chinese, Anglo-Americans, and Scandinavians. Data obtained through interviews were analyzed for clusters. Results revealed that many of the same words used in different cultural groups have different symbolic meanings. The researchers concluded that any test instrument, developed, and validated in one culture, may not necessarily be valid in another culture. Even verbal pain descriptions may yield the same scale score, but be expressions of different perceptual responses to pain. Hui and Chen (1984) assessed 80 Chinese patients experiencing headache in Taiwan. Instruments for measuring pain included the McGill Pain Questionnaire and Bakel Headache Topography Chart. Both instruments were translated into Chinese. Results indicated that fewer verbal descriptors from the McGill Pain Questionnaire were selected by the population compared with a similar study of Caucasian patients. These findings underscore the need for culturally sensitive instruments to measure subjective symptoms such as pain.

These few studies span a large time period during which cultural differences in the groups studied may have continued to evolve. Thus it is difficult to apply findings to future studies and to clinical practice without the potential for error.

### ***Assessment of Pain***

Because pain experienced by an individual is a multidimensional phenomenon, the challenge of assessment involves the development of valid and reliable instruments that capture information relevant to the various dimensions. Because no neurophysiological or chemical tests measure pain, the only way to assess pain is by the patient's subjective report. Nu-

merous pain assessment tools have been developed and have covered a variety of clinical uses including evaluation, management, and research. Many of the instruments have been reviewed by several authors (McGuire, 1984a, 1984b; McGuire & Sheidler, 1993; Hester & Barcus, 1986; Melzack, 1983; Wilkie et al., 1988) in relation to their characteristics, reliability, validity, and sensitivity. Most of these instruments were developed in the adult patient population, and within the English language. The focus in this chapter is on instruments useful in clinical assessment, differences between patients' and caregivers' assessment of the patient's pain, and the beginning area of assessment of the family's response to the patient with pain.

### ***Clinical Assessment of the Adult Patient***

Aspects important in the assessment of pain have been identified by various authors (Foley, 1985; Melzack, 1975; Stewart, 1977; McCaffery & Beebe, 1989). Various instruments have been reviewed by several authors (Chapman, Casey, Dubner, Foley, Gracely, & Reading, 1985; Karoly, 1985; McGuire, 1984b; Syrjala & Chapman, 1984). Common parameters include the complete assessment of the history of pain, evaluation of the patient's psychosocial status, medical and neurologic examination, use of appropriate diagnostic procedures to determine the nature of pain, early treatment with analgesics, continual reassessment of the patient's response to prescribed therapies, reassessment of the treatment approach or search for a new cause of the pain, and continuity of care from diagnosis to treatment.

The broad, multidimensional approach illustrates why so many assessment tools have been developed and used. Each tool may target a different aspect of assessment. Some tools are geared toward daily clinical use, while others are designed to collect information systematically during research studies. Some instruments are unidimensional and some are multidimensional.

Pain intensity is the assessment of the amount or severity of pain experienced. A great deal of research has focused on the use of various scales to measure pain intensity. Visual analogue scales (VAS) are commonly used and generally consist of 10 cm (or 100 mm) line scales for patients to communicate the extent of pain. This scale may be drawn vertically or horizontally.

Pain distress is different from intensity and focuses on the extent to which pain concerns the patient (Rosenstiel & Keefe, 1983; McGuire & Yarbro, 1987; Johnson, Rice, Fuller, & Endress, 1978). Pain

distress scales may be in a VAS format or a verbal descriptor format such as Likert scaling (none, mild, moderate, severe, excruciating).

One of the most widely used instruments for assessing pain is the McGill Pain Questionnaire (Melzack, 1975). This instrument, originally designed to measure the multidimensional aspects of pain, has been shown to be both valid and reliable. The instrument has a number of versions, including several one-page versions, a several-page version, and a nine-page version. Dimensions vary in the different versions. The time needed to complete the instruments varies considerably. The shorter forms are aimed at clinical evaluation, while the longer versions are intended to capture both historical data, and the cognitive, behavioral, and affective components of the pain experience. The longer version includes measurement of sensory, affective, evaluative, and miscellaneous aspects of pain, intensity, pattern, location, and factors related to pain such as sleep.

A meta-analysis of 51 studies was done to determine normative scores on the McGill Pain Questionnaire for seven painful conditions - cancer, low back, mixed chronic, acute/post-operative, labor/gynecological, dental, and experimental (Wilkie, Savedra, Holzemer, & Tesler, 1990). Findings produced grand weighted-mean scores to be used as estimates of normative mean scores for the seven pain conditions across the seven dimensions of the scale. These norms can be used as comparisons against data generated in current or future studies. An estimate of the common pain language used in these seven painful conditions also was identified. Because several forms of the McGill Pain Questionnaire exist, researchers should identify the specific version used when reporting study findings.

Daut, Cleeland, and Flannery (1983) developed the Wisconsin Brief Pain Questionnaire, a concise pain assessment instrument for clinical use. This instrument includes several dimensions: history of pain, site, intensity, medications, and treatments used to relieve pain, relief obtained, and the effects of pain on mood, activities, and interpersonal relationships. The instrument has established validity and reliability, and is useful clinically.

The Memorial Sloan-Kettering Pain Assessment Card is another multidimensional tool developed to decrease the clinical assessment burden to the patient and/or the nurse (Fishman, Pasternak, Wallenstein, Houde, Holland, & Foley, 1987). This instrument specifically targets cancer pain and contains three visual analogue scales on pain intensity, pain relief, and mood. Verbal descriptors of pain intensity are scattered in random

fashion on a page including such words as mild and moderate. The instrument takes up to two minutes to complete and is useful in on-going clinical assessment of pain.

McMillan, Williams, and Chatfield (1988) developed an instrument to assess cancer pain and monitor responses to various pain interventions. The Pain Assessment Tool includes information on pain history, intensity, location, quality, pattern, mitigating or exacerbating factors, and effects on other aspects of daily living. The Pain Flow Sheet then is used to collect on-going information on pain intensity, sedation level, and other symptoms related to various pain interventions. These two instruments show beginning reliability and validity (McMillan et al., 1988).

The instrument developed by Donovan et al. (1987) combined several instruments in the assessment of pain in medical-surgical patients. Components include selected portions of the McGill Pain Questionnaire, The Pain Figure, and the Present Intensity Index (PPI), as well as several other questions identifying the existence of pain, when it began, general characteristics, nurse discussion of the pain, effects of 19 factors potentially altering the pain experience, medications taken, and effects of pain on sleep. Authors reported high construct validity; interrater reliability was >0.90. Internal consistency was reflected by the fact that patients who reported taking pain medications at home were those who reported that their pain had begun months to years earlier. The length of time needed to administer the tool was not reported. This instrument shows beginning usefulness for descriptive studies of pain incidence, but must be tested in other settings to establish better generalizability across treatment settings.

Ferrell, Wisdom, Rhiner, and Alletto (1991) developed a Pain Audit Tool (PAT) which provides for systematic collection of information from a patient's chart to evaluate the effectiveness of the current analgesic regimen and identify the need for further interventions. Data include information on pain assessment documentation, orders for pain treatment including both medications and nondrug approaches, and documentation related to the effectiveness of implemented pain management strategies. This instrument targets the role of nursing administration and quality assurance in achieving pain relief for patients. The PAT has reported content validity as established by a panel of eight pain experts from across the country, interrater reliability of 0.73, and test-retest reliability of 0.81. The time needed to audit a chart using this instrument is approximately 17 minutes (range = 10 -

30 minutes). The instrument is useful in clinical studies as well as in the evaluation of specific clinical situations, and subsequent planning and evaluation of nursing care.

Another approach to assessing pain in cancer patients has been its impact on the patient's quality of life. This approach fits well with the charge of the Expert Committee on Cancer Pain Relief and Active Supportive Care of the World Health Organization for improving the quality of life of cancer patients (1990). Ferrell and associates (1989) adapted a Quality of Life Survey to use in cancer patients with pain. The instrument measures the multidimensional aspects of quality of life. Findings revealed internal consistency rating of  $>0.65$  and interrater reliability of  $0.94$ ; a content validity index calculated from expert panel scores was  $0.90$ . This instrument provides a method to evaluate the sensory dimension of pain and relates it to aspects of the affective, physical, cognitive, and sociocultural dimensions.

Wilkie and associates (1988) reported the development of an assessment instrument for the behavioral dimension of pain. Their investigation focused on cancer pain behaviors and correlated behavioral observations with a VAS scale of pain intensity and other demographic variables. The theoretical framework for the study combined concepts from the Gate Control Theory and Johnson's Behavioral System Model, and provided a perspective useful in discussing study findings. The sample consisted of 13 patients with advanced cancer. Behaviors were recorded by the researcher, who observed and noted both verbal and nonverbal behaviors that were subsequently validated or denied by patients as pain relieving behaviors. Behaviors included positioning behaviors, distractive behaviors, pressure manipulative behaviors, immobilizing/guarding behaviors, analgesic use behaviors, applying heat, altering attitude, and a miscellaneous grouping of behaviors including sleeping, eating, and moaning. Patients rated pain intensity on a VAS scale, and identified which of the observed behaviors reduced pain intensity. Correlations between the observed pain behaviors and the reported VAS for pain intensity ranged from  $0.46$  to  $0.64$ . These results provided a beginning basis for identifying pain control behaviors in cancer patients and expanding this knowledge to other cancer populations and to noncancer patients.

Research in assessment of the patient with pain has revealed a number of instruments that have been developed to measure the various dimensions of pain (Table 5.2). Some of the instruments have established reliability and validity; many have been used in only a few studies or with limited populations of

patients. Further instrument evaluation to determine usefulness for both clinical research and clinical assessment is needed.

### ***Patients' and Caregivers' Assessment of the Patient's Pain***

When in the hospital or at home cared for by the family, the patient's pain management is under the control of the nurse and/or the family caregiver. In these situations, undertreatment of pain may occur, some of which may be accounted for by differences between patients' and health care providers' assessments of pain. Several studies have identified the differences between pain assessment by patients and nurses. One was a study by Camp (Camp & O'Sullivan, 1987; Camp, 1988) which compared patients' descriptions of pain with nurses' documentation of pain. The three groups who were studied -- cancer patients, medical patients, and surgical patients -- all had comparable descriptions of pain and comparable levels of documentation. Findings revealed that nurses documented significantly less than 50% of what the patients described. Another study by Grossman, Sheidler, Swedeen, Jucenski, and Piantadosi (1991) correlated patients' VAS scores with VAS scores completed by a nurse, house officer, or oncology fellow. Results confirmed earlier findings, reporting no statistically significant correlation between the patient's VAS pain score and that of the health-care provider. Findings of both studies indicated a need for routine use of patient-rated pain assessment tools, and continued testing to determine what approaches work best in closing the gap between patients' and caregivers' assessments.

A variety of assessment tools is available, but questions remain related to what measures should be used for what purpose, and how to incorporate such measures into both research and clinical endeavors. Consistent and standardized approaches to assessment in the nursing management of pain continue to be an area for further study. Implementation of routine, easy to use, and sensitive pain assessment tools by patients could lead to better communication between patients and caregivers. However, controlled studies are needed to test this assumption. Certainly, documentation of patient's pain is needed for legal reasons, to provide an appropriate medical record of the patient's care. Utilization of one or more of the identified pain assessment tools would be a major step in solving the problem of incomplete and inaccurate documentation. Although various pain assessment tools have been tested for research purposes, their integration into clinical practice is minimal.

## ***Assessment of Families Involved in Patients with Pain***

Because many patients experience pain beyond the confines of the hospital, families are intimately involved in the management of pain. Health-care providers frequently are unfamiliar with the experience of pain outside the hospital setting. With increased home care and hospice care for patients with advanced disease, the involvement of health professionals in the patient's pain management outside the hospital has become increasingly frequent.

Studies by Ferrell and associates (Ferrell, Cohen, et al., 1991; Ferrell, Ferrell, et al., 1991; Ferrell, Rhiner, et al., 1991; Ferrell, Grant, et al., 1991) have indicated that family members play an important role in pain management for cancer patients at home. Advances in pain technology now require that families manage complex medication regimens, parenteral infusion devices and epidural catheters in the home. Families assess pain, make decisions regarding the amount and type of medication and determine when the dose of medication is to be taken. There is indication, however, that family members may deny the patient's pain to avoid realization that the disease is progressing. If family members are unable to manage pain in the home, readmission to the hospital for pain control may become necessary. Readmissions can be costly to the patient and the institution, particularly when reimbursement may be at risk. Findings point to a critical need to study and improve this area of pain management.

The complexity of pain assessment through family caregivers presents a challenge just beginning to be examined scientifically. Some investigations have focused on the family's past experience with pain, hypothesizing that an individual may actually learn pain behaviors by observing how other family members deal with pain (Crook, Rideout, & Browne, 1984; Violon & Giurgea, 1984). In Maruta's study (1981), identical check lists were given to chronic pain patients and their next of kin. The lists included pain duration, location, severity, effects on sleep, emotions, medication use, and other factors. Findings suggested that treatment outcome was related to the congruence between the patient and family member's perceptions of the pain problem.

As the burden of care shifts to the home, needs of family caregivers have become evident. These needs may include pain management concerns. Stetz (1987) described caregiving demands of 65 spouses of patients with advanced cancer. Content analysis of the interview data revealed that the demands most frequently reported (69%) were managing the physical

care and the treatment regimen. Findings documented the challenge of pain management and dealing with inadequate medication. These results echoed those of Hinds (1985) who reported that pain was the third most common physical problem (preceded by treatments, and nausea and vomiting) reported by families caring for cancer patients at home. More than 50% of the 83 family members reported this problem, and 30% also reported that they could not deal with the problem of pain.

Models for family research and family assessment are complex. Additional research is needed in the area of family involvement with pain assessment and management. This research will become increasingly important as more patients are cared for at home in both acute and chronic conditions in which pain management plays an important role.

## ***Interventions for Pain Management***

### ***Pharmacologic Interventions***

The pharmacologic management of pain has been developed through extensive laboratory and clinical studies. A review of the classes of medications used and the clinical problems of administration are provided in this section.

Drug development research is conducted primarily by neuroscientists, pharmacologists, and physicians (Bonica and Ventafridda, 1979). Three classes of analgesic drugs have been identified: 1) nonopioid analgesics - aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs); 2) opioid analgesics; and 3) analgesic adjuvants (World Health Organization, 1986). A review of the developmental research of these pharmacologic agents is beyond the scope of this report. Nevertheless, implications for continued research on specific drugs and mechanisms of action, pharmacokinetics, and effects in specific populations continue to be of high priority.

Areas of pharmacologic research include: development of guidelines for pharmacologic management, value of the preventive approach to the management of pain in various populations, selection of appropriate medications and doses, patient-controlled analgesic approaches, epidural route for medication administration, issues of pain medication management at home, new devices for drug delivery, and the management of drug side-effects.

Guidelines for using the three classes of medications based on existing research have been published by a number of organizations (American Pain Society, 1992; World Health Organization, 1986; Acute Pain Man-



agement Guideline Panel, 1992). These guidelines recommend clinical principles and provide the basis for collaboration by physicians, nurses, pharmacists, and patients in the selection and administration of appropriate medications for pain management. The clinical multidisciplinary approach is essential if pain management is to improve. Testing guideline implementation is an expected and needed area of research.

Inappropriate and undertreatment of pain in the clinical arena, however, continues and has been a persistent theme in the descriptive literature on the problem of pain management. A classic study by Marks and Sachar (1973) revealed undertreatment of pain in medical patients related to prescription of lower doses of drugs than recommended, administration of less doses than prescribed, and misconceptions about the duration of action and dangers of addiction. Inadequate pain management persists and reflects the urgent need for changes in the application of pain management principles (Donovan et al., 1987; Max, 1990).

Several approaches to pain management, if applied, could improve patients' comfort. The preventive approach in which medications are administered to stay ahead of the pain has been identified as appropriate for both postoperative and cancer patients (Rotter, Murphy, & Dudley, 1980; Foley & Inturrisi, 1987; Levy, 1985). This approach uses regularly scheduled analgesic administration, rather than administration when the patient complains of pain (PRN). This approach should be used for patients who have pain most of the day (American Pain Society, 1992).

Selection and administration of the correct medications has to be based on the patient's response to the pain relief measure used. Thus, a major clinical responsibility in administration of analgesics is the regular assessment of the patient before and after medication administration. When assessment reveals that the pain is not being managed appropriately, changes may be needed in doses, routes and/or types of medications. The World Health Organization guidelines provide a step-like analgesic ladder to follow when pain management is being initiated and the correct medication, dose and route are identified. Research provides the scientific background for these decisions (Sunshine & Olson, 1988; Ehrlich, 1983; Grond, Zech, Schug, Lynch, & Lehmann, 1991; Ventafridda, Tamburini, Caraceni, De Conno, & Naldi, 1987; Foley, 1985). The use of the narcotic equivalency index provides a method for changing from one route to another and from one medication to another (American Pain Society, 1992).

Another useful approach to adequate and appropriate medication administration is the use of patient-controlled analgesia (PCA). King, Norsen, Robertson, and Hicks (1987) investigated the effects of self-administered versus nurse-administered pain medication after cardiac surgery, using the framework of patients' desire for control. A sample of 64 adult patients undergoing coronary bypass surgery or valve replacement surgery was studied. Instruments included scales to assess pain intensity, disruption in daily activities due to pain, emotional upset due to pain, as well as other measurements related to moods, emotions, and control issues. Findings revealed no differences across groups for pain intensity, disruption of daily activities, or emotional upset. In fact, experimental group subjects reported higher levels of pain intensity on the day they began to self-medicate. This was explained by the investigators as possibly related to an increased focus on pain because patients were responsible for their own pain management. The study demonstrated that patients were able to administer their own pain medication in the surgical intensive care situation. No differences were found between groups receiving PCA versus groups receiving continuous medication in a study by Hansen, Noyes and Lehman (1991).

Other studies illustrate advantages of PCA. Lange, Dahn, and Jacobs (1988) compared PCA and intermittent analgesic dosing in 16 male patients requiring posterolateral thoracotomy. Eight patients received intermittent doses of buprenorphine hydrochloride (0.3 mg intramuscularly every 3 to 6 hours) and eight patients provided for their own analgesia through a self activated PCA device containing buprenorphine (Buprenex). Findings revealed significant reductions in postoperative pulmonary complications rates, less medication, and reduced post-operative fever in the PCA group. Bennett, Batenhorst, Bivins, Bell, Graves, Foster, Wright, and Griffen (1982) also found advantages in PCA in a group of patients undergoing gastric surgery and randomized to PCA versus standard intramuscular dosages of morphine. Patients in the PCA group were able to maintain a state of analgesia without undue sedation, and were more satisfied with the PCA approach to pain management than was the other group. Atwell, Flanigan, Bennett, Allen, Lucas, & McRoberts (1984) randomized 10 patients undergoing flank incisions comparing PCA to parenterally administered analgesia. Adequate analgesia without sedation was reported more frequently in the PCA group as was less pain, less sedation, and a higher activity level.

These studies, which illustrate the large body of research on PCA, reveal some controversial findings. Additional studies are needed with larger samples and different populations of patients.

The epidural route for analgesia is useful primarily in patients unable to achieve adequate analgesia from the oral or parenteral routes. Studies on epidural analgesia have been conducted primarily on cancer patients in the United States and Europe (Table 5.3). Descriptive studies have illustrated the effectiveness of this route, but few randomized studies have been reported. This probably relates to the small number of patients eligible for this treatment because less invasive forms of analgesia, including the aggressive use of systemic opiates, are generally effective if administered according to guidelines (Hogan, Haddox, Abram, Weissman, Taylor, & Janjan, 1991). For patients for whom other forms of analgesia are not effective, epidural analgesia has provided effective pain relief with varying rates of complications (Malone, Beye, & Walker, 1985; Brazenor, 1987; Meed, Kleinman, Kantor, Blum, & Savarese, 1987; Arner, Rawal, & Gustafsson, 1988; Cate, Monsarrat, Gouarderes, Verdie, Lazorthes, Cros, & Bastide, 1988; Samuelsson & Hedner, 1991; Hogan et al., 1991). This area of analgesic management needs additional studies to improve identification of appropriate patient populations, efficacy of selected medications, and management of catheter and medication side-effects.

With early discharge of patients from acute care settings, the site for pain management through pharmacologic intervention has become a focus for nursing investigation. A study of bereavement outcomes in families caring for cancer patients dying at home as compared with hospital deaths described the grief responses of 60 caregivers, 8-11 months post-patient death. The study revealed that one of the issues of most concern for family members caring for patients at home was uncontrolled pain (Ferrell, 1985). Another study evaluated pain management at home by comparing the pain experience and management of 75 cancer patients with pain during the hospital stay and 7-10 days post-discharge (Ferrell & Schneider, 1988). The study used the McGill Melzack Pain Questionnaire, the Pain Experience Measure developed by the investigators, and a semi-structured interview. Results demonstrated that pain is not well managed at home and that family caregivers play an important role in pain management. Patients often experienced decreased pain management to stay at home and families experienced physical and psychological burdens in attempting to treat the pain of the cancer patient at home. Patients in the study were undermedicated and rarely used non-pharmacologic interventions.

The side-effects of analgesic management have received little attention. Common side-effects include pruritus, constipation, urinary retention, and nausea and vomiting (Ferrell, Wisdom, Wenzl, & Brown, 1989; McGuire and Sheidler, 1993). Just how the anal-

gesic side-effects influence nurses' and patients' use of pain medications, and the impact of pain relief have not been addressed. Studies of the impact of pain on quality of life reveal that a major contributor to poor quality of life is the existence of unrelieved pain and the occurrence of related side-effects (Ferrell, Wisdom, & Wenzl, 1989; Ferrell, Grant, Padilla, Vemuri, & Rhiner, 1991). Additional work in this area is urgently needed.

In summary, a variety of studies have been conducted on the pharmacologic management of pain, some on issues related to the undertreatment of pain, some on the setting for pain management, and some on various methods and routes of administration. Collaborative interdisciplinary studies seem to be an appropriate way to maintain the continued development of knowledge related to the nursing aspects of pharmacologic management. A variety of pharmacologic agents of increasing strength are available for use. Guidelines specify how to use these medications to relieve clinical pain. Nonetheless, studies are needed on guideline application, new routes and methods for drug administration, application of pain management principles in the home setting, and management of side-effects.

### ***Nonpharmacologic Approaches***

Nondrug pain management has had little systematic testing, as compared with pharmacologic approaches. Even so, most pain experts agree that a combination of drug and nondrug strategies provide the best approach to pain management (Melzack & Wall, 1982; Saunders, 1979; Chapman, 1979; Bond, 1979).

Cognitive-behavioral nonpharmacologic approaches include biofeedback, relaxation, imagery, music therapy, hypnosis, and distraction (Copp, 1974; Donovan, 1981; McCaffery & Beebe, 1989; Snyder, 1985). Relaxation has been used effectively in elderly patients with postoperative fractured hip pain (Ceccio, 1984). A sampling of additional studies using cognitive-behavioral approaches is found in Table 5.4. Within this group are three meta-analyses, focusing on relaxation therapy and its impact on clinical symptoms (Hyman, Feldman, Harris, Levin, & Malloy, 1989), preoperative instruction and its effect on postoperative outcomes (Hathaway, 1986), and sensory and procedural information on coping with stressful medical procedures and pain (Suls & Wan, 1989). Findings indicated beginning support for these modalities in relieving pain. They generally are used in combination with medications. Their impact without medications is less well known.

Other studies in Table 5.4 focused on imagery, relaxation training, self-hypnosis, progressive muscle relaxation, use of support groups, and education using procedural, sensory, and/or coping behaviors (Drake & Gueldner, 1989; Scott & Clum, 1984; Melzack & Chapman, 1973; Dalton, Toomey, & Workman, 1988; Beck, 1991; Spiegel & Bloom, 1983a, 1983b; Spiegel, Bloom, & Yalom, 1981; Devine & Cook, 1986). Many of these studies did not report control over multiple clinical variables such as disease state and had small sample sizes and varying medication approaches to pain management. They reported beginning success with cognitive-behavioral approaches and provided the basis for continued studies in this area. The studies on education using procedural, sensory, and/or coping behaviors are extensive and build on Johnson's research in this area (Johnson, 1973; Johnson & Rice, 1974; Levanthal & Johnson, 1983; Johnson, Nail, Lauer, King, & Keys, 1988; Barsevick & Johnson, 1990). Sufficient evidence has been amassed to provide a foundation for continued testing of educational approaches for patients in pain. Additional studies need to control variables such as disease, disease state, and other clinical conditions.

Studies of physical nonpharmacologic interventions focus on the physical dimension of pain and include modalities such as heat, cold, massage, and the TENS machine (Table 5.5). Studies draw from a variety of patient populations - obstetric, cancer, and postoperative patients. Responses vary across studies, and need larger sample sizes and replications. Repeated studies are especially important in providing sufficient data to have an impact on clinical practice. Each of the modalities shows beginning promise as a valuable approach to augmenting pharmacologic management of pain. The TENS machine (Hargreaves & Lander, 1989), used in a variety of situations, has a varied impact across studies. Additional work is needed to identify groups of patients who are most likely to benefit from these approaches.

Nonpharmacologic studies in other dimensions include descriptive studies of pain and clinical approaches to pain management (Table 5.6), including development, use, and evaluation of pain assessment instruments (Paice, Mahon, & Faut-Callahan, 1991; Wilkie, 1991; Dobratz, Wade, Herbst, & Ryndes, 1991). Additional research is needed especially on instrument refinement, clinical applicability, and ease of administration. No studies identified the usefulness of pain flow sheets in providing effective pain management, particularly those sensitive enough to identify inter- and intra-patient differences. Also, studies were not identified that examine assessment results in different cultural populations. Some studies tested different settings for pain management such as use of pal-

liative care units and hospice facilities (Barkwell, 1991; Dobratz et al., 1991). These studies provide a beginning basis for further evaluation of these alternative approaches to pain management.

Nondrug approaches alone may be useful for mild pain, and as a valuable adjunct to drug management. Nondrug approaches infrequently are implemented by health professionals. However, this area has great potential for additional research and may provide valuable additional nursing interventions.

## Research Needs and Opportunities

Although extensive research has been done on pain management in the adult with acute and episodic pain, the relief of pain in the population is not yet evident. Additional research is needed on the dimensions of pain, assessment, pharmacologic interventions, and nonpharmacologic interventions.

### *Dimensions of Pain in the Adult*

The usefulness of a multidimensional framework for the study of pain has been initially confirmed in studies to date. This framework provides a valuable approach for the assessment and management of pain. The studies conducted within the framework of the dimensions of pain reveal a beginning understanding of several of the dimensions. Continued study is needed in each of these areas, plus examination of the interactions between and among dimensions.

In the physiologic dimension of pain in the adult, additional research is needed on the physiologic mechanisms involved in pain and on analgesic activity. For specific pain conditions, descriptive research is needed to provide patterns of occurrence in various pain populations (postoperative, sickle cell, cancer, AIDS, etc). The sensory dimension needs additional research on measurement issues and methodologies. The affective dimension has revealed beginning descriptive information about the suffering component of the pain experience. Additional descriptive research also is needed in this area.

Studies have revealed the importance of the cognitive dimension, and identified potential interventions specifically related to cognitive functioning. Continued testing of these approaches is needed, and is especially important in terms of increased patient responsibility for care because of early discharge and increased home care. The behavioral dimension is less well developed, and needs additional research especially related to the value of this dimension in patient assessment. Finally, the sociocultural dimension re-

veals a beginning description of cultural differences that may impact pain reporting, control, and management. These studies span a number of years; thus, findings may not be relevant to the cultural beliefs of current ethnic populations. Additional research is needed on cultural differences, and will require culturally sensitive assessment instruments. Research is also needed on the relationship between and among the various dimensions of pain in the adult patient.

### **Assessment**

A variety of instruments has been developed for pain assessment. This variety reflects different clinical needs, and different purposes (clinical management versus clinical research, for example). Reliability and validity of clinical tools need to be established. The lack of a clinical monitoring tool is especially evident, and crucial to the improved clinical management of patients with pain. Culturally sensitive instruments need to be developed and tested. Additional research is needed on how to assist families in assessing and managing pain in the home.

### **Pharmacologic Interventions**

While the number of medications available for managing pain has increased, additional research is needed on what medications to use when, what side effects to expect and how to manage them, what routes are most appropriate and for whom, and mechanisms of action. A large void was found in the area of demonstration projects, or dissemination projects, where application of currently available guidelines is evaluated. Needed are studies that demonstrate methods for improving implementation of current knowledge on pain management in the care of the patient in the hospital and home.

### **Nonpharmacologic Interventions**

The nonpharmacologic interventions have been studied the least, but small clusters of studies have begun to illustrate a foundation for further progress. Cognitive-behavioral approaches have been tested the most, and need replication in a variety of populations controlling for variables such as disease, disease state, and other clinical manifestations. The non-pharmacologic studies involving physical approaches (heat, cold, massage, and TENS) need to be studied in larger numbers of patients to identify which patients could benefit from these approaches. Studies need to identify the relationship between pharmacologic and nonpharmacologic interventions, and when each or both are appropriate.

## **Recommendations**

Based on the foregoing assessment of research needs and opportunities, the Panel has made the following recommendations concerning acute and episodic pain in the adult:

- Design and test approaches to pain assessment that are culturally sensitive and can be useful for both clinical research and clinical practice.
- Develop and test interventions for the suffering component of pain.
- Test approaches for the application of currently available guidelines for the clinical management of pain. This may take the form of demonstration projects or dissemination projects, but would necessitate inclusion of patient pain outcomes as a component of evaluation.
- Test appropriateness and adequacy of non-pharmacologic approaches to pain, including their impact on the dimensions of pain and their relationship to pharmacologic approaches. Emphasis on cognitive and physical approaches provides a beginning scientific foundation on which to build the clinical testing of specific nonpharmacologic approaches.
- Investigate the physiological dimension of pain, exploring physiological mechanisms involved, neurotransmitters, opioid receptors, and the impact of pain and pain relief on the immune system.

## **References**

- Acute Pain Management Guideline Panel. (1992). *Acute pain management: Operative or medical procedures and trauma. Clinical practice guideline*. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services, AHCPR Pub. No. 92-0032.
- Ahles, T.A., Ruckdeschel, J.C., & Blanchard, E.B. (1983). The multidimensional nature of cancer-related pain. *Pain*, 17, 277-288.
- Ahles, T.A., Ruckdeschel, J.C., & Blanchard, E.B. (1984). Cancer-related pain--II. Assessment with visual analogue scales. *Journal of Psychosomatic Research*, 28, 121-124.
- American Pain Society. (1992). *Principles of analgesic use in the treatment of acute pain and cancer pain*. Skokie, IL: American Pain Society.

- Arathuzik, M.D. (1991). The appraisal of pain and coping in cancer patients. *Western Journal of Nursing Research*, 13(6), 714-731.
- Arner, S., Rawal, N., & Gustafsson, L.L. (1988). Clinical experience of long-term treatment with epidural and intrathecal opioids - A nationwide survey. *Acta Anaesthesiologica Scandinavica*, 32, 253-259.
- Atwell, J.R., Flanigan, R.C., Bennett, R.L., Allen, D.C., Lucas, B.A., & McRoberts. (1984). The efficacy of patient-controlled continuous infusion by implanted pump. *Neurosurgery*, 21(4), 282-491.
- Barbour, L.A., McGuire, D.B., & Kirchhoff, K.T. (1986). Nonanalgesic methods of pain control used by cancer outpatients. *Oncology Nursing Forum*, 13(6), 56-60.
- Barkwell, D. (1991). Ascribed meaning: A critical factor in coping and pain attenuation in patients with cancer-related pain. *Journal of Palliative Care*, 7(3), 5-14.
- Barsevick, A.M. & Johnson, J.E. (1990). Preference for information and involvement, information seeking and emotional responses of women undergoing colposcopy. *Research in Nursing and Health*, 13(1), 1-7.
- Beck, S.L. (1991). The therapeutic use of music for cancer-related pain. *Oncology Nursing Forum*, 18(8), 1327-1337.
- Beecher, H.K. (1946). Pain in men wounded in battle. *Annals of Surgery*, 123, 96-105.
- Beecher, H.K. (1956). Relationship of significance of wound to pain experienced. *Journal of the American Medical Association*. 161, 1609-1613.
- Bellamy, N. (1989). Pain assessment in osteoarthritis: Experience with the WOMAC Osteoarthritis Index. *Seminars in Arthritis and Rheumatology*, 18(4) Suppl. 2, 14-17.
- Benjamin, L.J. (1989). Pain in sickle cell disease. In K.M. Foley, & R.J. Payne (Eds.), *Current therapy of pain* (pp. 90-104). Philadelphia: B.C. Decker.
- Bennett, R.L., Batenhorst, R.L., Bivins, B.A., Bell, R.M., Graves, D.A., Foster, T.S., Wright, B.D., & Griffen, W.O. (1982). Patient-controlled analgesia: A new concept of postoperative pain relief. *Annals of Surgery*, 195(6), 700-705.
- Bond, M.R. (1979). Physiologic and psychiatric techniques for the relief of pain in advanced cancer. In J. Bonica, & V. Ventafridda (Eds.), *Advances in pain research and therapy*. New York: Raven Press, 215-222.
- Bond, M.R., & Pilowsky, I. (1966). Subjective assessment of pain and its relationship to the administration of analgesics in patients with advanced cancer. *Journal of Psychosomatic Research*, 10, 203-208.
- Bonica, J.J. (1985). Treatment of cancer pain: Current status and future needs. In H. L. Fields, R. Dubner, & F. Cervero (Eds.), *Advances in pain research and therapy*, 9, *Proceedings of the Fourth World Congress on Pain* (pp.589-616). New York: Raven Press.
- Bonica, J.J., & Ventafridda, F. (Eds.). (1979). *Advances in pain research and therapy*, 2. New York: Raven Press.
- Boobis, L.H., & Bell, P.R.J. (1982). Can drugs help patients with lower limb ischemia. *British Journal of Surgery*, 62(Suppl): S17-S23.
- Brazenor, G.A. (1987). Long term intrathecal administration of morphine: A comparison of bolus injection via reservoir with continuous infusion by implanted pump. *Neurosurgery*, 21(4), 484-91.
- Bressler, L.R., Hange, P.A., & McGuire, D.B. (1986). Characterization of the pain experience in a sample of cancer outpatients. *Oncology Nursing Forum*, 13(6), 51-55.
- Burgoon, C.F., Burgoon, J.S., & Baldrige, G.D. (1957). The natural history of herpes zoster. *Journal of the American Medical Association*, 164, 265-269.
- Camp, L.D. (1988). A comparison of nurses' recorded assessments of pain with perceptions of pain as described by cancer patients. *Cancer Nursing*, 11(4), 237-243.
- Camp, L.D., & O'Sullivan, P.S. (1987). Comparison of medical, surgical and oncology patients' descriptions of pain and nurses documentation of pain assessments. *Journal of Advanced Nursing*, 12, 593-598.
- Cassel, E.J. (1982). The nature of suffering and the goals of medicine. *New England Journal of Medicine*, 306, 639-645.
- Caute, B., Monsarrat, B., Gouarderes, C., Verdie, J.C., Lazorthes, Y., Cros, J., & Bastide, R. (1988). CSF morphine levels after lumbar intrathecal administration of isobaric and hyperbaric solutions for cancer pain. *Pain*, 32, 141-146.
- Ceccio, C.M. (1984). Postoperative pain relief through relaxation in elderly patients with fractured hips. *Orthopaedic Nursing*, 3(3), 11.

- Chapko, M.K., Syrjala, K.L., Bush, N., Jedlow, C., & Renee, M. (1991). Development of a behavioral measure of mouth pain, nausea, and wellness for patients receiving radiation and chemotherapy. *Journal of Pain and Symptom Management*, 6(1), 15-23.
- Chapman, C.R. (1979). Psychologic and behavioral aspects of pain. In J. Bonica, & V. Ventafridda (Eds.), *Advances in pain research and therapy, 2, Proceedings of the International Symposium on Pain of Advanced Cancer* (pp. 45-48). New York: Raven Press.
- Chapman, C.R., Casey, K.L., Dubner, R., Foley, K.M., Gracely, R.H., & Reading, H.E. (1985). Pain measurement: An overview. *Pain*, 22(1), 1-31.
- Clark, W.C., Yang, J.C., & Janal, M.N. (1986). Altered pain and visual sensitivity in humans: The effect of acute and chronic stress. In D.D. Kelly (Ed.), *Stress-induced analgesia, Annals of New York Academy of Science*, 467, 116-129.
- Cleeland, C.S. (1985). Measurement and prevalence of pain in cancer. *Seminars in Oncology Nursing*, 1(2), 87-92.
- Colding, A. (1969). The effect of sympathetic blocks on herpes zoster. *Acta Anaesthesiologica Scandinavica*, 13, 133-141.
- Copp, L. (1974). The spectrum of suffering. *American Journal of Nursing*, 74(3), 491-495.
- Copp, L. (1990a). The nature and prevention of suffering. *Journal of Professional Nursing*, 6(5), 247-249.
- Copp, L. (1990b). Treatment, torture, suffering, and compassion. *Journal of Professional Nursing*, 6(1), 1-2.
- Crook, J., Rideout, E., & Browne, G. (1984). The prevalence of pain complaints in a general population. *Pain*, 18, 299-314.
- Dalton, J., Toomey, T., & Workman, M.R. (1988). Pain relief for cancer patients. *Cancer Nursing*, 11(6), 322-328.
- Daut, R.L., & Cleeland, C.S. (1982). The prevalence and severity of pain in cancer. *Cancer*, 50, 1913-1918.
- Daut, R.L., Cleeland, C.S., & Flannery R.C. (1983). Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain*, 17, 197-210.
- Davis, G.C. (1989). Measurement of chronic pain experience: Development of an instrument. *Research in Nursing and Health*, 12, 221-227.
- Devine, E.C. & Cook, T.D. (1983). A meta-analytic analysis of effects of psychoeducational interventions on length of postsurgical hospital stay. *Nursing Research*, 32(5), 267-274.
- Devine, E., & Cook, T. (1986). Clinical and cost-saving effects of psychoeducational interventions with surgical patients: A meta-analysis. *Research in Nursing and Health*, 9, 89-105.
- Dobratz, M.C., Wade, R., Herbst, L., & Ryndes, T. (1991). Pain efficacy in home hospice patients: A longitudinal study. *Cancer Nursing*, 14(1), 20-26.
- Donovan, M. (1981). *Cancer care: A guide for patient education*. New York: Appleton-Century-Crofts.
- Donovan, M.I. (1985). Nursing assessment of cancer pain. *Seminars in Oncology Nursing*, 1(2), 109-113.
- Donovan, M.I. (1987). Clinical assessment of cancer pain. In D.B. McGuire, & C.H. Yarbrow (Eds.), *Cancer pain management* (pp. 105-131). Orlando, FL: Grune & Stratton.
- Donovan, M., Dillon, P., & McGuire, D. (1987). Incidence and characteristics of pain in a sample of medical-surgical inpatients. *Pain*, 30, 69-78.
- Downie, W.W., Leatham, P.A., Rhind, V.M., Wright, V., Branco, J.A., & Anderson, J.A., (1978). Studies with pain rating scales. *Annals of the Rheumatic Diseases*, 37, 378-381.
- Drake, E.R., & Gueldner, S.H. (1989). Imagery instruction and the control of postsurgical pain. *Applied Nursing Research*, 2(3), 114-120.
- Dubner, R. (1992). The molecular biology of persistent pain. *Frontiers of pain research in the decade of the brain. Proceedings of the National Academy of Sciences*, (pp. 18-26). Washington, D.C.
- Dubuisson, D., & Melzack, R. (1976). Classification of clinical pain descriptions by multiple group discriminant analysis. *Experimental Neurology*, 51, 480-487.
- Ehrlich, G.E. (1983). *The resurgence of salicylates in arthritis therapy*. Norwalk, CT: Scientific Media Communications, Inc.

- Emrich, H.M. (1981). The role of endorphins in neuropsychiatry. In T.A. Ban, (Ed.), *Modern problems of pharmacopsychiatry*, 17, (pp. 1-292). New York: Basal.
- Faires, J.E., Mills, D.S., Goldsmith, K.W., Phillips, K.D., & Orr, J. (1991). Systematic pain records and their impact on pain control: A pilot study. *Cancer Nursing*, 14(6), 306-313.
- Farber, M.D., Koshy, M., & Kinney, T.R. (1985). Cooperative study of sickle cell disease: Demographic and socioeconomic characteristics of patients and families with sickle cell disease. *Journal of Chronic Diseases*, 38, 495-505.
- Ferrell, B.R. (1985). Home vs hospital cancer deaths and bereavement outcomes. *The American Journal of Hospice Care*, July/August, 18-26.
- Ferrell, B.R., Cohen, M., Rhiner, M., & Rosek, A. (1991). Pain as a metaphor for illness. Part II: Family caregivers' management of pain. *Oncology Nursing Forum*, 18(8), 1315-1321.
- Ferrell, B.R., Ferrell, B.A., Rhiner, M., & Grant, M. (1991). Family factors influencing cancer pain management. *Post Graduate Medical Journal*, 67(Suppl 2), S64-S69.
- Ferrell, B.R., Grant, M., Padilla, G.P., Vemuri, S., & Rhiner, M. (1991). The experience of pain and perceptions of quality of life: Validation of a conceptual model. *The Hospice Journal*, 7(3), 9-24.
- Ferrell, B.R., McCaffery, M., & Rhiner, M. Pain and addiction: An urgent need for change in nursing education. (1992). *Journal of Pain and Symptom Management*, 7(2), 117-124.
- Ferrell, B.R., McGuire, D., & Donovan, M.I. (1993). Knowledge and beliefs regarding pain in a sample of nursing faculty. *Journal of Professional Nursing*, 9(2), 79-88.
- Ferrell, B.R., Rhiner, M., Cohen, M.Z., & Grant, M.M. (1991). Pain as a metaphor for illness. Part I: Impact of cancer pain on family caregivers. *Oncology Nursing Forum*, 18(8), 1303-1309.
- Ferrell, B.R., & Schneider, C. (1988). Experience and management of cancer pain at home. *Cancer Nursing*, 11(2), 84-90.
- Ferrell, B.R., Wisdom, C., & Wenzl, C. (1989). Quality of life as an outcome variable in the management of cancer pain. *Cancer*, 63, 2321-2327.
- Ferrell, B.R., Wisdom, C., Rhiner, M., & Alletto, J. (1991). Pain management as a quality of care outcome. *Journal of Nursing Quality Assurance*, 5(2), 50-58.
- Ferrell, B., Wisdom, C., Wenzl, C., & Brown, J. (1989). Effects of controlled-release morphine on quality of life for cancer pain. *Oncology Nursing Forum*, 16(4), 521-526.
- Field, R.B. (1990). Promoting deliberate nursing interventions in cancer pain management. *Rehabilitation and Supportive Care*, 17(2), 183.
- Fields, H.L. (1987). *Pain*. New York: McGraw-Hill.
- Fishman, B., Pasternak, S., Wallenstein, S.L., Houde, R.W., Holland, J., & Foley, K.M. (1987). The Memorial Pain Assessment Card: A valid instrument for the assessment of cancer pain. *Cancer*, 60, 1151-1157.
- Flannery, R.B., Sos, J., & McGovern, P. (1981). Ethnicity as a factor in the expression of pain. *Psychosomatics*, 22, 39-40.
- Foley, K.M. (1979). Pain syndromes in patients with cancer. In J.J. Bonica, & V. Ventafridda (Eds.), *Advances in pain research and therapy*, 2, (pp. 59-75). New York: Raven Press.
- Foley, K.M. (1985). The treatment of cancer pain. *New England Journal of Medicine*, 313, 84-95.
- Foley, K.M. (1992). Cancer pain: New initiatives in research and education. *Frontiers of pain research in the decade of the brain, Proceedings of the National Academy of Sciences* (pp. 11-17). Washington, D.C.
- Foley, K.M., & Inturrisi, C.E. (1987). Analgesic drug therapy in cancer pain: Principles and practices. *Medical Clinics of North America*, 71, 207-232.
- Foley, K.M., & Inturrisi, C.E. (1989). Pharmacologic approaches to cancer pain. In K.M. Foley, & R.M. Payne (Eds.), *Current therapy of pain* (pp. 303-331). Philadelphia: B.C. Decker.
- Gaston, M.H., & Rosse, W. (1982). The cooperative study of sickle cell disease: Review of study design and objectives. *American Journal of Pediatric Hematology and Oncology*, 4, 197-200.
- Gaston-Johansson, F., & Asklund-Gustafsson, J. (1985). A baseline study for the development of an instrument for the assessment of pain. *Journal of Advanced Nursing*, 10, 539-546.

- Gaston-Johansson, F., Fridh, G., & Turner-Norvell, K. (1988). Progression of labor pain in primiparas and multiparas. *Nursing Research*, 37, 86-90.
- Graffman, S. & Johnson, A. (1987). A comparison of two relaxation strategies for the relief of pain and its distress. *Journal of Pain and Symptom Management*, 2(4), 229-231.
- Grond, S., Zech, D., Schug, S.A., Lynch, J., & Lehmann, K.A. (1991). Validation of World Health Organization Guidelines for cancer pain relief during the last days and hours of life. *Journal of Pain and Symptom Management*, 6(7), 411-422.
- Grossman, S.A., Sheidler, V.R., Swedeen, K., Jucenski, J., & Piantadosi, S. (1991). Correlation of patient and caregiver ratings of cancer pain. *Journal of Pain and Symptom Management*, 6(2), 53-57.
- Guyton-Simmons, J., & Mattoon, M. (1991). Analysis of strategies in the management of coronary patients' pain. *Dimensions in Critical Care Nursing*, 10(1), 21-27.
- Halsell, M. (1967). Moist heat for relief of postoperative pain. *American Journal of Nursing*, 67(4), 767-770.
- Hansen, L.A., Noyes, M.A., & Lehman, M.E. (1991). Evaluation of patient-controlled analgesia (PCA) versus PCA plus continuous infusion in postoperative cancer patients. *Journal of Pain and Symptom Management*, 6(1), 4-14.
- Hardy, W.R. (1981). Sickle cell anemia as a problem in pain management. In L.C. Marc (Ed.), *Pain control: Practical aspects of patient care*. New York: Masson.
- Hargreaves, A., & Lander, J. (1989). Use of transcutaneous electrical nerve stimulation for postoperative pain. *Nursing Research*, 38(3), 159-161.
- Hathaway, D. (1986). Effect of preoperative instruction on postoperative outcomes: A meta-analysis. *Nursing Research*, 35(5), 269-274.
- Hester, N.O., & Barcus, C.S. (1986). Assessment and management of pain in children. *Pediatrics: Nursing Update*, 1(14), 1-8.
- Hinds, C. (1985). The needs of families who care for patients with cancer at home: Are we meeting them? *Journal of Advanced Nursing*, 10, 575-581.
- Hofgren, J.K., Bondestam, E., Gaston-Johansson, F., Jern, S., Herlitz, J., & Holmberg, S. (1988). Initial pain course and delay to hospital admission in relation to myocardial infarct size. *Heart and Lung*, 17, 274-280.
- Hogan, Q., Haddox, J.D., Abram, S., Weissman, D., Taylor, M.L., & Janjan, N. (1991). Epidural opiates and local anesthetics for the management of cancer pain. *Pain*, 46, 271-279.
- Houde, R.W. (1979). Analgesic effectiveness of the narcotic agonist-antagonists. *British Journal of Clinical Pharmacology*, 7, 297S-308S.
- Hui, H.L., & Chen, A.C.N. (1984). Headache in Taiwan: Assessment and characterization by a Chinese version of the McGill Pain Questionnaire and headache topography chart. *Pain*, 2(Suppl.), S90.
- Hyman, R., Feldman, H., Harris, R., Levin, R., & Malloy, G. (1989). The effects of relaxation training on clinical symptoms: A meta-analysis. *Nursing Research*, 38(4), 216-220.
- Jaffe, J.H., & Martin, W.R. (1985). Opioid analgesics and antagonists. In L.S. Goodman, & A.G. Gilman (Eds.), *Goodman and Gilman's the pharmacological basis of therapeutics* (7th ed.) (pp. 491-553). New York: Macmillan Publishing Company.
- Janal, M.N., Colt, E.W.D., Clark W.C., & Glusman, M. (1984). Pain sensitivity, mood and plasma endocrine levels in man following long-distance running: Effects of naloxone. *Pain*, 19, 13-25.
- Jensen, M.P., Karoly, P., & Braver, S. (1986). The measurement of clinical pain intensity: A comparison of six methods. *Pain*, 27, 117-126.
- Jensen, M.P., Karoly, P., O'Riordan, E.F., Bland, F., & Burns, R.S. (1989). The subjective experience of acute pain: An assessment of the utility of 10 indices. *Clinical Journal of Pain*, 5, 153-159.
- Johnson, J.E. (1973). The effects of accurate expectations about sensations on the sensory and distress components of pain. *Journal of Personality and Social Psychology*, 27, 261-275.
- Johnson, J., Nail, L., Lauver, D., King, K., & Keys, H. (1988). Reducing the negative impact of radiation therapy on functional status. *Cancer*, 61(1), 46-51.
- Johnson, J.E., & Rice, V.H. (1974). Sensory and distress components of pain: Implications for the study of clinical pain. *Nursing Research*, 23, 203-209.



- Johnson, J.E., Rice, V.H., Fuller, S.S., & Endress, M.P. (1978). Sensory information instruction in a copy strategy and recovery from surgery. *Research in Nursing and Health*, 1, 4-17.
- Karoly, P. (1985). The assessment of pain: Concepts and procedures. In P. Karoly (Ed.), *Measurement strategies in health psychology* (pp. 461-519). New York: Wiley Interscience.
- Keele, K.D. (1948). The pain chart. *The Lancet*, 2, 6-8.
- Keele, K.D. (1983). The temporal aspects of pain: The pain chart. In Melzack, R. (Ed.), *Pain measurement and assessment* (pp. 205-213). New York: Raven.
- King, K.B., Norsen, L.H., Robertson, R.K., & Hicks, G. (1987). Patient management of pain medication after cardiac surgery. *Nursing research*, 36(3), 145-150.
- Konotey-Ahulu, F.I.D. (1974). The sickle cell disease. *Archives of Internal Medicine*, 133, 611-619.
- Kremer, E., Atkinson, J.H., & Ignelzi, R.J. (1981). Measurement of pain: Patient preference does not confound pain measurement. *Pain*, 10, 241-248.
- LaFoy, J. & Geden, E.A. (1989). Postepisiotomy pain: Warm versus cold sitz bath. *Journal of Obstetrics and Neonatal Nursing*, Sept/Oct: 399-403.
- Lange, M.P., Dahn, M.S., & Jacobs, L.A. (1988). Patient-controlled analgesia versus intermittent analgesia dosing. *Heart and Lung*, 17, 495-498.
- Lebovits, A.H., Lefkowitz, M., McCarthy, D., Simon, R., Wilpon, H., Jung, R., & Fried, G. (1989). The prevalence and management of pain in patients with AIDS: A review of 134 cases. *The Clinical Journal of Pain*, 3, 245-248.
- Levanthal, H., & Johnson, J.E. (1983). Laboratory and field experimentation: Development of a theory of self-regulation. In P.J. Wooldridge, M.H. Schmitt, J.K. Skipper, Jr. & R.C. Leonard (Eds.), *Behavioral science and nursing theory* (pp. 189-262). St. Louis: C.V. Mosby.
- Levy, M.H. (1985). Pain management in advanced cancer. *Seminars in Oncology*, 12, 394-410.
- Liebeskind, J.C. (1992). Pain can kill. *Frontiers of pain research in the decade of the brain. Proceedings of the National Academy of Sciences* (pp. 8-10). Washington, D.C.
- Lipton, J.A., & Marbach, J.J. (1984). Ethnicity and the pain experience. *Social Science Medicine*, 19, 1279-1298.
- Littman, G.S., Walker, B.R., Schneider, B.E. (1985). Reassessment of verbal and visual analog ratings in analgesic studies. *Clinical Pharmacology and Therapeutics*, 38, 16-23.
- Macaluso, C. Weinberg, D., & Foley, K.M. (1988). Opioid abuse and misuse in a cancer pain population. *Journal of Pain and Symptom Management*, 3, S24.
- Malone, B.T., Beye, R., & Walker, J. (1985). Management of pain in the terminally ill by administration of epidural narcotics. *Cancer*, 55, 438-440.
- Marks, R.M., & Sachar, E.J. (1973). Undertreatment of medical inpatients with narcotic analgesics. *Annals of Internal Medicine*, 78, 173-181.
- Martin, W.R., Eades, C.G., & Thompson, J.A. (1976). The effects of morphine and nalorphine-like drugs in the nondependent and morphine-dependent chronic spinal dog. *Journal of Pharmacology and Experimental Therapeutics*, 197, 517-532.
- Maruta, T., Osborne, D., Swanson, D.W., & Halling, T.M. (1981). Chronic pain patients and spouses: Marital and sexual adjustment. *Mayo Clinic Proceedings*, 56, 307-310.
- Mateo, O.M., & Krenzischek, D.A. (1992). A pilot study to assess the relationship between behavioral manifestations and self-report of pain in postanesthesia care unit patients. *Journal of Post Anesthesia Nursing*, 7(1), 15-21.
- Max, M.B. (1990). Improving outcomes of analgesic treatment: Is education enough? *Annals of Internal Medicine*, 113(11), 885-889.
- McCaffery, M., & Beebe, A. (1989). *Pain: Clinical manual for nursing practice*. St Louis: C.V. Mosby.
- McGuire, D. (1984a). Assessment of pain in cancer inpatients using the McGill Pain Questionnaire. *Oncology Nursing Forum*, 11(6):32-35.
- McGuire, D. (1984b). The measurement of clinical pain. *Nursing Research*, 33, 152-156.
- McGuire, D.B. (1987a). Cancer-related pain: A multidimensional approach. Unpublished doctoral dissertation. University of Illinois, Chicago. Health Science Center.

- McGuire, D.B. (1987b). Advances in control of cancer pain. *Nursing Clinics of North America*, 22(3), 677-689.
- McGuire, D.B., & Sheidler, V.R. (1993). Pain. In S.L. Groenwald, M.H. Frogge, M. Goodman, C.H. Yarbrow (Eds.), *Cancer nursing: Principles and practice* (pp. 385-441). Boston: Jones and Bartlett.
- McGuire, D., & Yarbrow, C. (1987). *Cancer pain management*. New York: Grune & Stratton.
- McMillan, S.C., Williams, F.A., & Chatfield, R. (1988). A validity and reliability study of two tools for assessing and managing cancer pain. *Oncology Nursing Forum*, 15, 735-741.
- Meed, S.D., Kleinman, P.M., Kantor, T.G., Blum, R.H., & Savarese, J.J. (1987). Management of cancer pain with oral controlled-released morphine sulfate. *Journal of Clinical Pharmacology*, 27(2), 155-61.
- Melzack, R. (1975). The McGill Pain Questionnaire: Major properties and scoring. *Pain*, 1, 277-299.
- Melzack, R. (1983). *Pain measurement and assessment*. New York: Raven Press.
- Melzack, R., & Chapman, C.R. (1973). Psychologic aspect of pain. *Postgraduate Medicine*, 53(6), 69-75.
- Melzack, R., & Torgerson, W.S. (1971). On the language of pain. *Anesthesiology*, 34, 50-59.
- Melzack, R. (1987). The short-form McGill Pain Questionnaire. *Pain*, 30, 191-197.
- Melzack, R., & Wall, P. (1982). *The challenge of pain*. New York: Basic Books.
- Millan, M.J. (1986). Multiple opioid systems and pain. *Pain*, 27, 303-347.
- Miller, J.F., & Shuter, R. (1984). Age, sex, race affect pain expression. *American Journal of Nursing*, 84, 981.
- Moore, R.A., & Dworkin, S.F. (1988). Ethnographic methodologic assessment of pain perceptions by verbal description. *Pain*, 34, 195-204.
- Moss, F.T., & Meyer, B. (1966). The effects of nursing interaction upon pain relief in patients. *Nursing Research*, 15(4), 303-306.
- Offermeier, J., & Van Rooyen, M.M. (1984). Opioid drugs and their receptors: A summary of the present state of knowledge. *South African Medical Journal*, 66, 299-305.
- Paice, J.H., Mahon, S.M., & Faut-Callahan, M. (1991). Factors associated with adequate pain control in hospitalized post-surgical patients diagnosed with cancer. *Cancer Nursing*, 14, 298-305.
- Payne, R.M. (1989). Pain in the drug abuser. In K.M. Foley, & R.M. Payne (Eds.), *Current therapy of pain* (pp. 46-54). Philadelphia: B.C. Decker.
- Perry, S., & Heidrich, G. (1982). Management of pain during debridement: A survey of U.S. burn units. *Pain*, 13, 267-280.
- Perry, S., Heidrich, G., & Ramos, E. (1981). Assessment of pain by burn patients. *Journal of Burn Care and Rehabilitation*, 2, 322-326.
- Platt, O.S., Thorington, B.D., Brambilla, D.J., Milner, P.F., Rosse, W.F., Vichinsky, E., & Kinney, T.R. (1991). Pain in sickle cell disease. *New England Journal of Medicine*, 325, 11-16.
- Portenoy, R.K. (1989). Cancer pain: Epidemiology and syndromes. *Cancer*, 63, 2298-2307.
- Portenoy R.K., Duma, C., & Foley, K.M. (1986). Acute herpetic and postherpetic neuralgia: Clinical review and current management. *Annals of Neurology*, 20, 651-664.
- Rankin, M.A. (1980). The progressive pain of cancer. *Topics in Clinical Nursing*, 2, 57-73.
- Rankin, M.A. (1982). Use of drugs for pain with cancer patients. *Cancer Nursing*, 5, 181-190.
- Reizien, A., & Meleis, A.J. (1986). Arab-American perceptions of and responses to pain. *Critical Care Nurse*, 6, 30-37.
- Rogmagnoli, A., & Keats, A.J.S. (1980). Ceiling effect for respiratory depression by nalbuphine. *Clinical Pharmacology and Therapeutics*, 27, 478-485.
- Rosenstiel, A.K., & Keefe, F.J. (1983). The use of coping strategies in chronic low back pain. *Pain*, 17, 33-44.
- Rotter, P.C., Murphy, F., & Dudley, H.A.F. (1980). Morphine: Controlled trial different methods of administration for post operative pain relief. *British Medical Journal*, 1, 12-13.
- Samuelson, H., & Hedner, T. (1991). Pain characterization in cancer patients and the analgesic response to epidural morphine. *Pain*, 46, 3-8.

- Saunders, C. (1979). The nature and management of terminal pain and the hospice concept. In J. Bonica, & V. Ventafridda (Eds.), *Advances in pain research and therapy. Proceedings of the International Symposium on the Pain of Advanced Cancer*. New York: Raven Press.
- Schofferman, J. (1988). Pain: Diagnosis and management in the palliative care of AIDS. *Journal of Palliative Care*, 4(4), 46-49.
- Scott, L.E., & Clum, G.A. (1984). Examining the interaction effects of coping style and brief interventions in the treatment of postsurgical pain. *Pain*, 20, 279-291.
- Sherman, R.A., & Barja, R.H. (1989). Postamputation and phantom-limb pain. In M.K. Foley, & R.M. Payne (Eds.), *Current theory of pain* (pp. 142-149). Philadelphia: B.C. Decker.
- Snyder, S.H. (1977). Opiate receptors in the brain. *New England Journal of Medicine*, 296, 266-271.
- Snyder, M. (1985). *Independent nursing interventions*. New York: John Wiley & Sons.
- Spiegel, D., & Bloom, J. (1983a). Group therapy and hypnosis reduce metastatic breast carcinoma pain. *Psychosomatic Medicine*, 45, 333-339.
- Spiegel, D., & Bloom, J. (1983b). Pain in metastatic breast cancer. *Cancer*, 52, 341-345.
- Spiegel, D., Bloom, J.R., & Yalom, I. (1981). Group support for patients with metastatic cancer. *Archives in General Psychiatry*, 38, 527-533.
- Spross, J.A. (1985). Cancer pain and suffering: Clinical lessons from life, literature and legend. *Oncology Nursing Forum*, 12(4), 23-31.
- Stam, H.J., Goss, C., Rosenal, L., Ewens, S., & Urton, B. (1985). Aspects of psychological distress and pain in cancer patients undergoing radiotherapy. In H.L. Fields (Ed.), *Advances in pain research and therapy*, 9 (pp. 569-57). New York: Raven Press.
- Sternbach, R.A. (1976). Psychological factors in pain. In J.J. Bonica, & D. Albe-Fessard (Eds.), *Advances in pain research and therapy*, 1 (pp. 293-299). New York: Raven Press.
- Stetz, K.M. (1987). Caregiving demands during advanced cancer. *Cancer Nursing*, 10(5), 260-268.
- Stewart, M.L. (1977). Measurement of clinical pain. In A.K. Jacox (Ed.), *Pain: A source book for nurses and other health professionals* (pp. 107-137). Boston: Little, Brown and Company.
- Suls, J., & Wan, C. (1989). Effects of sensory and procedural information on coping with stressful medical procedures and pain: A meta-analysis. *Journal of Consulting and Clinical Psychology*, 57(3), 372-379.
- Sunshine, A., & Olson, N.Z. (1988). Analgesic efficacy of ketoprofen in postpartum, general surgery, and chronic cancer pain. *Journal of Clinical Pharmacology*, 28, 547-554.
- Sweet, W.H. (1986). Controversies in the treatment of trigeminal neuralgia (tic douloureux). *New England Journal of Medicine*, 315, 174-177.
- Syrjala, K.L., & Chapman, C.R. (1984). Measurement of clinical pain: A review and integration of research findings. In C. Benedetti, C. R. Chapman, & G. Moricca (Eds.), *Advances in pain research and therapy* (pp. 71-101). New York: Raven Press.
- Tamsen, A., Sakurada, T., & Wahlstrom, A. (1982). Postoperative demand for analgesics in relation to individual levels of endorphins and substance P in cerebrospinal fluid. *Pain*, 13, 171-183.
- Taylor, L. M., & Porter, J.M. (1986). Drug treatment of claudication: Vasodilators, hemorrhheologic agents, and antiserotonin drugs. *Journal of Vascular Surgery*, 3(2), 374-381.
- Terenius, L. (1984). The endogenous opioids and other central peptides. In P.D. Wall, & R. Melzack (Eds.), *Textbook of pain* (pp. 133-141). Edinburgh: Church Livingstone.
- Tew, J., & Van Loveren, H. (1988). Percutaneous rhizotomy in the treatment of intractable facial pain. In H.H. Schymidek, & W.H. Sweet (Eds.), *Operative neurosurgical techniques* (pp. 1111-1123). New York: Grune & Stratton.
- Timmermans, G., & Sternbach, R.A. (1976). Human chronic pain and personality: A canonical correlation analysis. In J. Bonica, & D. Albe-Fessard (Eds.), *Advances in pain research and therapy*, 1 (pp. 307-310). New York: Raven Press.
- Twycross, R.G., & Fairfield, S. (1982). Pain in far-advanced cancer. *Pain*, 14, 303-310.

- Ventafridda, V., Ripamonti, C., De Conno, F., Tamburini, M., & Cassileth, B.R. (1990). Symptom prevalence and control during cancer patients' last days of life. *Journal of Palliative Care*, 6(3), 7-11.
- Ventafridda, V., Tamburini, M., Caraceni, A., De Conno, F., & Naldi, F. (1987). A validation study of the WHO method for cancer pain relief. *Cancer*, 59, 850-856.
- Violon, A., & Giurgea, D. (1984). Familial models for chronic pain, *Pain*, 18, 199-203.
- Wagner, M. (1977). Pain and nursing care associated with burns. In A.K. Jacox (Ed.), *Pain: A source book for nurses and other health professionals* (pp. 27-56). Boston: Little, Brown, and Company.
- Walker, J.M., Akinsanya, J.A., Davis, B.D., & Marcer, D. (1990). The nursing management of elderly patients with pain in the community: Study and recommendations. *Journal of Advanced Nursing*, 15, 1154-1161.
- Wall, P.D., & Melzack, R. (Eds.). (1984). *Textbook of pain* (2nd ed.). London: Churchill Livingstone.
- Watson, C.P. Evans, R.J., Reed, K., Merskey, H., Goldsmith, L., & Warsh, J. (1982). Amitriptyline vs. placebo in postherpetic neuralgia. *Neurology*, 32, 671-673.
- Weinrich, S.P. & Weinrich, M.C. (1990). The effect of massage on pain in cancer patients. *Applied Nursing Research*, 3(4), 140-145.
- Wells, N. (1982). The effect of relaxation on postoperative muscle tension and pain. *Nursing Research*, 31, 236-238.
- Whipple, B., & Komisaruk, B.R. (1985). Elevation of pain threshold by vaginal stimulation in women. *Pain*, 21, 357-367.
- Wilkie, D.J. (1990). Cancer pain management: State-of-art nursing care. *Nursing Clinics of North America*, 25(2), 331-343.
- Wilkie, D.J. (1991). Lung cancer pain coping strategies. *Communication Nursing Research*, 24, 15-23.
- Wilkie, D.J., Savedra, M.C., Holzemer, W.L. Tesler, M.D., & Paul, S.M. (1990). Use of the McGill Pain Questionnaire to measure pain: A meta-analysis. *Nursing Research*, 39(1), 36-41.
- Wilkie, D., Lovejoy, N., Dodd, M., & Tesler, M. (1988). Cancer pain control behaviors: Description and correlation with pain intensity. *Oncology Nursing Forum*, 15(6), 723-731.
- Wolff, B.B., & Langley, L. (1975). Cultural factors and the response to pain: A review. In E. Weisenberg (Ed.), *Pain: clinical and experimental perspectives* (pp. 144-151). St. Louis: C.V. Mosby.
- Wood, P.L. (1982). Multiple opiate receptors: Support for unique mu, delta and kappa sites. *Neuropharmacology*, 21, 487-497.
- World Health Organization. (1986). Cancer pain relief. Geneva, Switzerland: World Health Organization.
- World Health Organization. (1990). Cancer pain relief and palliative care: Report of a WHO expert committee. Geneva, Switzerland: World Health Organization.
- Yaksh, T.L., Durant, P.A.C., Gaumann, D.M., Stevens, C.W., & Mjanger, E. (1987). The use of receptor-selective agents as analgesics in the spinal cord: Trends and possibilities. *Journal of Pain and Symptom Management*, 2, 129-138.
- Zborowski, M. (1952). Cultural components in response to pain. *Journal of Social Issues*, 8(4), 16-30.
- Zola, I.K. (1966). Illness behavior of the working class: Implications and recommendations. In A. Shostak, & W. Gomberg (Eds.), *Blue collar world - Studies of the American worker* (pp. 350). Englewood Cliffs, NJ: Prentice-Hall.